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REPORT OF THE OPERATIONS OF THE OIL AND GAS CONSERVATION BOARD

1965

OIL AND GAS CONSERVATION BOARD
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1982

THE OIL AND GAS CONSERVATION BOARD

REPORT OF THE OPERATIONS OF

PREFACE

This report is the third edition of an annual report on the operations of the Oil and Gas Conservation Board. It is prepared for the purpose of acquainting members of the Legislative Assembly of Alberta, the oil and gas industry and the public at large with the responsibilities, organization and activities of the Board.

To meet the publication date of previous issues of the report, it was necessary to give preliminary estimates for some of the statistical data and comparisons presented. In making comparisons in the next issue of the report, corrected figures for the preceding year were used. These corrections have led to some confusion, so the Board has decided to delay publication of this and future reports until statistics on wells and production, and the Board's final figures for year-end reserves and productivity are complete. Consequently this report and future editions of it will be issued early in May of each year. Financial data in Section VI will continue to be presented on the basis of actual data for ten months and estimates for the last two months of the fiscal year - April 1 to March 31.

The report is introduced with a brief discussion of the general activities of the oil and gas industry in 1965, emphasis being placed on those related to conservation. Following this is a summary of the constitution, responsibilities and functions of the Board; a discussion of its organization and staff; and a general summary of important statutory changes affecting the Board and policy changes made by the Board during 1965. The main section of the report deals with the responsibilities, organization

and activities of the several departments of the Board and discusses the role of each in the discharge of the overall responsibilities of the Board. Following this is a statement of Board expenditures and revenues, comparing them with previous years and with indices of industry and Board activity. Finally a brief section describes the publications of the Board and lists technical and other papers and addresses prepared or given by members of the Board and its staff.

G. W. Govier
Chairman

April, 1966

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I THE ALBERTA OIL AND GAS INDUSTRY IN 1965

Exploration

Exploration was concentrated principally in the Rocky Mountain House, Red Earth-Mitsue, Taber-Bantry-Brooks and Rainbow areas, indicating an orientation of attention towards oil. In particular, significant oil discoveries at Rainbow have stimulated activity and interest in the North-western part of the Province. Exploration for gas was broadly directed, with some emphasis on the search for additional gas reserves in the general Marten Hills-Calling Lake region, north of Edmonton.

As measured by the 990 wildcat wells drilled in 1965, exploration activity increased some 33 per cent over the total of 724 wildcat wells drilled in 1964. The degree of success, measured by the fraction of wildcat wells finding commercial oil or gas was slightly lower at 25 per cent in 1965 than the level of 27 per cent in 1964.

Development

The number of development wells drilled in 1965 was 1,108, little changed from the 1,098 drilled in 1964. Successful oil and gas wells included in these numbers were 760 and 102 respectively in 1965; the corresponding figures for 1964 were 747 and 125. Despite the increase in the number of wells, development footage drilled declined by some 9 per cent during 1965 to 5,898,123 feet, compared with 6,454,366 feet during the prior year. The average well depth decreased from 5,878 feet in 1964 to 5,323 feet in 1965.

The principal development drilling for oil occurred in the Mitsue, Nipisi, Medicine River, Pembina and Swan Hills fields and the Taber-Bantry area. Development drilling for gas was concentrated mainly in the Medicine Hat, Edson, Sylvan Lake and Beaverhill Lake fields and the Marten Hills, Gold Creek and Obed areas.

Reserves

Initial recoverable reserves of crude oil increased by some 433 million barrels during 1965. Production totalled 184 million barrels; hence, remaining reserves increased by some 249 million barrels to 6,077 million barrels as at December 31, 1965, as compared to 5,828* million barrels at the end of 1964.

Most of the increase in initial reserves was attributable to reserve appreciation in previously discovered pools, notably the Fenn-Big Valley D-2A, Golden Spike D-3A, Snipe Lake Beaverhill Lake and Nipisi and Mitsue Gilwood Pools. Of interest was an increase in heavy crude oil reserves by approximately 25 per cent, to a level of 139 million barrels. Most of this increase occurred in the Wainwright-Lloydminster area and in Southern Alberta. New discoveries accounted for only small additions, which is normal until development drilling demonstrates the existence of additional recoverable reserves.

Of special significance in 1965 were the discoveries in the

---

*The reserve data shown in the 1964 Annual Report were estimates. The 1964 figure shown here is actual, and reflects a significant increase over the estimate, attributable to additional information made available to the Board at the first annual Reserves Hearing held in February, 1965.

Keg River and Muskeg formations of the Rainbow area in Northwestern Alberta. While the December 31, 1965 crude oil reserves of the Province include only minor amounts attributable to these discoveries, it is anticipated that substantial additions to crude oil reserves in the Rainbow area will be booked in 1966 and subsequent years.

No further studies have been made of the reserves of the oil sands of Northern Alberta. The Board's estimate made in 1963 of 711 billion barrels of raw oil-in-place, with recoverable reserves of up-graded synthetic crude oil of some 300 billion barrels, is therefore the most recent available.

Initial reserves of marketable gas increased by 3.2 trillion cubic feet to 43.0 trillion cubic feet, as at December 31, 1965. After allowing for production during 1965 of 0.9 trillion cubic feet, the remaining reserves of marketable gas rose from 35.3 trillion cubic feet at December 31, 1964 to 37.6 trillion cubic feet at December 31, 1965. As with the crude oil reserves, the additions to gas reserves resulted primarily from appreciation of reserves in previously discovered pools, particularly in the Gold Creek, Crossfield East, Pembina, Brazeau River and Harmattan-Elkton areas.

Reserves of propane rose by some 27 million barrels in 1965 to a level of 356 million barrels at December 31, 1965. Butane reserves increased by some 23 million barrels to a level of 234 million barrels over the same period. Pentanes plus reserves totalled some 671 million barrels, exhibiting a substantial increase of 121 million barrels from the level of 550 million in

1964. This 22 per cent increase in pentanes plus reserves is chiefly attributable to modest increases in gas reserves and in expected liquid recoveries from a number of pools, together with a significant increase in the reserve attributed to the Gold Creek Wabamun pool. Reserves of natural gas liquids, therefore, totalled some 1,260 million barrels as at December 31, 1965.

Sulphur reserves increased markedly to some 98 million long tons, a rise of 23 million over the 1964 level. These numbers exclude expected recovery of sulphur from the Great Canadian Oil Sands project.

Crude Oil Productive Capacity

As discussed in a later section, changes in the Board's procedures governing both the maximum rates of oil production and in particular the significant effect on the number of producing wells in many new and older pools have altered the basis for determining the crude oil productive capacity of the Province. As a consequence, future estimates of productive capacity will have to be made with recognition of the significant reduction in short term capacity which will result. For the purpose of this report, the MPR-based capacity, adjusted for pools with productivity limitations, is continued for 1965.

From the evidence submitted at the October, 1964 MPR hearing, the Board estimated the productive capacity at December 31, 1964 at 1.14 million barrels per day, and later revised this to an estimated 1.31 million barrels per day following the February, 1965 reserve hearing. On an equivalent basis, the December 31, 1965 capacity is estimated to be 1.35 million barrels per day, a

value slightly less than the Board's estimate of 1.45 million barrels per day derived from the provincial total of PRL's (OGCB Report 65-3) adjusted for productivity limitations known to exist in Pembina and a number of smaller pools.

Production and Markets

In 1965, the average rate of crude oil production increased by 5 per cent over 1964, from 480,000 barrels per day to 503,000 barrels per day. An 11 per cent increase was recorded in the rate of production of pentanes plus, which averaged 73,000 barrels per day, compared with 66,000 barrels per day in 1964.

All of the increase in Alberta's production of crude oil and pentanes plus during 1965 was absorbed by Canadian domestic markets. In 1965, these markets consumed 354,000 barrels per day from Alberta sources of supply with total requirements west of the Ottawa Valley amounting to 577,000 barrels per day; the corresponding figures in 1964 were 323,000 barrels per day and 538,000 barrels per day respectively. Thus, Alberta's share of this market increased slightly from 60 per cent in 1964 to 61 per cent in 1965. Exports from Alberta to the United States in 1965 remained at the level of 222,000 barrels per day recorded in 1964. Consumption of Alberta crude oil and equivalent feed stock within Alberta increased by 12 per cent from 80,200 barrels per day in 1964 to 89,800 barrels per day in 1965.

Production of raw natural gas increased from 1,185 billion cubic feet in 1964 to 1,290 billion cubic feet in 1965. Marketable gas production expanded from 772 billion cubic feet in 1964

to 843 billion cubic feet in 1965, a rise of 9 per cent. Most of the increase in Alberta gas production was absorbed by Canadian markets, principally Ontario, while exports to the United States rose only by some 2 per cent. Marketed gas consumed by Alberta increased from 164 billion cubic feet in 1964 to 178 billion cubic feet in 1965. The difference between raw gas production and gas marketed is accounted for by 208 billion cubic feet of storage or re-injection, 114 billion cubic feet of processing shrinkage, and a remaining 125 billion attributable to plant fuel requirements and unavoidable waste.

Considerable increases were recorded in propane and butane production. Net propane production rose from 15,400 barrels per day in 1964 to 25,000 barrels per day in 1965, a 63 per cent increase, while net butane production expanded by 30 per cent from 12,800 barrels per day in 1964 to 16,700 barrels per day in 1965. These increases were to some extent a consequence of the rise in output of natural gas but more significantly reflected the expanding markets for propane and butane, resulting in more extensive processing and recovery, principally at the Empress plant. Marketed production of propane amounted to 24,100 barrels per day in 1965 and for butane 15,300 barrels per day, representing increases of 78 per cent and 30 per cent respectively over 1964 figures. Most of the expansion was absorbed by the development of Canadian and export markets.

Sulphur production expanded by some 9 per cent over 1964 to 1,538,000 long tons. Increased production, apart from that attributable to the rise in throughput of natural gas, resulted from

the new Wimborne plant and from expanded facilities at the Carstairs plant. Strong offshore markets were primarily responsible for a 14 per cent increase in demand to 1,738,000 long tons and, hence, for the second successive year, inventories were reduced to meet the difference between requirements and production.

Conservation Activity

Development in Oil

Complementing its report on the review of the proration plan in 1964, the Board published during 1965 OGCB Report 65-3, relating to the control, in the interest of prevention of reservoir waste, of maximum production rates of oil wells. The principal feature of the new policy is that the maximum rate limitation will be calculated generally on a pool basis and distributed, when necessary, within a pool in proportion to area. This change runs parallel to the direction of the changes introduced by the new proration plan. The formula adopted for determining maximum rates is based on pool reserves and a suitable constant, the latter being related to the pool's recovery mechanism and other characteristics.

The period of transition to the new proration plan commenced May 1, 1965 and amendments to the regulations permitted significant reductions in both drilling and production costs by reducing the number of wells drilled in newly developing oil pools and by permitting the shutting-in of excess wells in many of the older, closely spaced pools.

Water flood schemes predominated in new enhanced recovery

projects initiated during the year. Such schemes were introduced for the first time in the Edson Cardium Pool and Medicine River Jurassic B Pool. In addition, substantial additional portions of the Pembina Cardium Pool, Swan Hills Beaverhill Lake A and B Pools and the Willesden Green Cardium Pool were converted to water flood.

The growing world interest in thermal recovery methods has been reflected in increased activity in Alberta. Several experimental and pilot schemes to evaluate steam injection and other thermal recovery techniques are being carried on, all in the heavy crude oil or oil sands areas of Lloydminster, Cold Lake, Fort McMurray and Peace River.

Increased movements of heavy crude oil from the Lloydminster area resulted in the building of a second pipe line from Hardisty to Lloydminster to permit additional movements of pentanes plus, utilized for blending with the heavy crude oil. The pipe line from Mitsue to Redwater was completed during the year, and at the year end work was proceeding on a pipe line connecting the Rainbow area to the Mitsue-Redwater-Edmonton pipe line.

Developments in Gas and Propane

Of significant interest in 1965 were hearings before the Board of applications by The British American Oil Company Limited and Canadian Hydrocarbons Limited for the removal of propane from the Province. To appraise these applications, the Board conducted a detailed study of propane reserves and supply, and the future Alberta requirements for propane. The Board reported on

the applications in OGCB Report 65-11, published in September, 1965 and, with the approval of the Lieutenant Governor in Council, issued a permit authorizing removal by British American of some 2,000 barrels per day of propane, over a 10 year period, and a permit to Canadian Hydrocarbons authorizing removal of a maximum amount of propane ranging from some 2,100 barrels per day to 1,500 barrels per day over a 20 year period. In late November, the Board heard an application by Pacific Petroleums Ltd. for a substantial increase in the amount of propane it is authorized to remove from the Province. Study of the evidence was continuing at the year end.

Significant additional conservation of gas associated with crude oil production was achieved by industry in 1965 in the Carson Creek North, Willesden Green and Wimborne fields. Also, an improved level of conservation of gas produced with oil in the Swan Hills Field resulted from an increase in the Judy Creek gas processing plant capacity from 40 to 55 million cubic feet per day. Improved conservation of natural gas liquids will follow from gas plant load-levelling schemes approved for the Carstairs and Crossfield fields, which will permit the use of idle plant capacity.

Government Revenues

Total government revenues from oil and gas mineral rights rose to a level of some $245 million, compared to $188 million in the prior year. Crown reserve sales accounted for the largest increase, both proportionate and absolute, rising by 41 per cent to some $120 million in 1965 from $85 million in 1964. Royalty

payments expanded to $68 million from $61 million, a rise of 12 per cent, while rental payments increased 33 per cent from $43 million in 1964 to $57 million in 1965.

The total government revenue per barrel of equivalent crude oil production - converting natural gas, natural gas liquids and sulphur on a market value basis to the equivalent number of barrels of crude oil - was 89 cents or 35 per cent of the gross value per barrel in 1965. Of this figure, 43 cents was attributable to Crown reserve sales, 25 cents to royalty payments and 21 cents to rentals. Corresponding figures for 1964 on a total basis were 73 cents and 29 per cent and, split among the three categories of revenue, 33 cents, 23 cents and 17 cents respectively.

Industry Revenues

Revenues to the oil and gas industry from production in Alberta during 1965 amounted to some $704 million, an increase of 8 per cent over the 1964 figure of $652 million. The greatest proportional gain was in sulphur revenue, which at $24 million represented a 44 per cent increase over 1964. Since the tonnage of sulphur sales increased only by 14 per cent, the greater proportionate increase in sulphur revenue reflects substantial price increases obtained throughout the year. Gas, propane and butane revenue recorded gains of some 12 per cent in total, with gas revenue amounting to $123 million, an 8 per cent rise, propane totalling $11 million, 81 per cent more than in 1964, and butane amounting to $7 million, a 37 per cent increase. The value of crude oil and pentanes plus sales rose by 6 per cent from some

$511 million in 1964 to $540 million in 1965 which, when related to the production increase of 5 per cent, reflects the increased proportion of the higher priced pentanes plus supplying the oil market.

II RESPONSIBILITIES AND FUNCTIONS OF THE BOARD

The Board is established by The Oil and Gas Conservation Act for the purpose of administering that Act. It is also charged with the administration of The Gas Resources Preservation Act, 1956, and The Turner Valley Unit Operations Act. Additionally, it may be called upon to supply information and advice to the Department of Mines and Minerals, particularly in connection with applications for permits under The Pipe Line Act, 1958. Finally, the Board, like the Public Utilities Board, may refer applications that touch on matters in part within the purview of each of the Boards to the Gas Utilities Board, of which the Chairman of the Oil and Gas Conservation Board is a member and to which the Board gives technical and other assistance in connection with applications referred by it.

The purposes of The Oil and Gas Conservation Act are to effect the conservation and prevent the waste of the oil and gas resources of the Province, to secure the observance of safe and efficient field practices, and to afford each owner of oil or gas the opportunity of obtaining his share of the production of any pool. The Board must see that, in the light of sound engineering and economic principles, oil field operations are so conducted that wells are properly located, spaced, drilled, equipped and produced so that the recovery of oil or gas from a pool is not lessened and reservoir energy is not improperly dissipated, that enhanced recovery techniques are used where suitable, that waste of gas is minimized, that proper storage facilities are used, and

that oil or gas is not produced in excess of demand or of storage and transportation facilities.

To carry out these functions the Board employs the appropriate personnel including engineers, geologists and others. It maintains a head office in Calgary, a northern district office in Edmonton and area offices in major oil and gas regions. The Board issues regulations and orders pertaining to drilling and producing operations; considers applications by operators; has its staff conduct inspections and make studies; and collects, summarizes and publishes various data.

Under The Oil and Gas Conservation Act, the Board also is charged with the examination of schemes, either of an experimental or commercial character, of obtaining production from oil sands. The Board also, under Part VII of the Act, assesses and taxes oil and gas properties to obtain a revenue to cover a portion of its expenses under the Act. The carrying out of its duties and responsibilities under this Act and other Acts requires the Board to conduct investigations, hold hearings and prepare reports.

The Turner Valley Unit Operations Act empowers the Board, upon application, to order a part of the Turner Valley Rundle Pool to be operated as a unit. Under this Act, four oil productive and one gas productive units have been established encompassing substantially all of the Turner Valley Field.

The purpose of The Gas Resources Preservation Act, 1956, is to provide for the effective utilization of the gas resources of the Province, having regard to the present and future needs of persons within the Province. For this purpose the Board must

from time to time determine the volumes of established reserves of gas and propane in the Province and the trends in growth and discovery of gas and propane reserves and the present and future needs for gas and propane within the Province. Applications for permits for the removal of gas or propane from the Province are considered in the light of such determinations and may be granted if it is in the public interest to do so.

III ORGANIZATION AND STAFF

The Board consists of three members, including a Chairman, Deputy Chairman and Board Member, appointed by the Lieutenant Governor in Council. The members are appointed for a five year term and thereafter during the pleasure of the Lieutenant Governor in Council.

The Board's senior advisers are its Chief Engineer, Mr. D. R. Craig, and its Solicitor, Mr. N. A. Macleod. They provide technical and legal advice directly to the Board and, where appointed for the purpose, function as acting Board members. An Applications Advisory Group under the Chairmanship of the Chief Engineer and including the Board Solicitor and the Managers of the Gas, Oil and Development Departments advises the Board on routine applications for an order of the Board.

The organization chart presented in Figure 1 indicates the overall organization of the Board showing its various departments. The departments vary in size, ranging from 70 employees in the Development Department to three in the Personnel Department. Each Department Head is responsible to the Board for carrying out the functions assigned to his department as summarized in Section V of this report. In addition to the normal departmental responsibilities, the Managers of the Oil Department, the Gas Department and the Development Department serve with other senior staff as examiners at hearings.

During 1965, the Board, after extensive investigations, decided that its present LGP-30 computer and Univac 1004 data

processing systems were becoming inadequate to carry out the Board's functions efficiently and economically. Accordingly, the Board entered into an agreement to rent an IBM System/360 Model 30 computer, to be installed by January, 1967. A substantial reorganization of the Board's data processing systems is necessary to make effective use of the new system. To this end, the Board consolidated its former Special Studies and Programming Department and its Tabulating Department in a new Data Processing Department headed by Mr. E. Stoian as Manager. Mr. E. J. Morin has been appointed Supervisor of Engineering Programming for the Department, and Mr. H. G. Blackburn is Supervisor of Operations.

In 1965, the Board maintained seven area offices that were staffed by engineers and technicians whose basic responsibility is to inspect drilling and producing procedures in oil and gas fields. Area offices are located at Red Deer, Black Diamond and Medicine Hat in the Southern district and at Camrose, Drayton Valley, Redwater and Devon in the Northern district. However, by February, 1966, the Camrose, Redwater and Devon offices will be consolidated in one new office in Edmonton. This consolidation will result in reduced expenditures and improved efficiency. The Engineer or Area Supervisor in charge of each area office is responsible to the appropriate district engineer who, in turn, is responsible to the Manager of the Development Department.

A general statement regarding the division of Board responsibilities would specify that the Development Department is responsible for the drilling and production practices of the industry, and the Oil and the Gas Departments are responsible for ensuring

maximum conservation from oil and gas pools as discovered and developed. The Gas Department is additionally responsible for assisting the Board in controlling the volumes of gas and propane removed from the Province. The Geology Department, the Data Processing Department and the Chemical Laboratory provide technical assistance to the Board directly and to the three main engineering departments. In addition, certain special engineering studies are carried out by the Data Processing Department with assistance from seconded staff of other departments. The Economic Studies Department and the Production Accounting Division of the Accounting Department provide economic and statistical data and assistance. The Economic Studies Department also administers the oil proration plan with the assistance of the Oil Department. The Office Services and the Personnel Departments and the Financial Accounting Division perform services for the Board organization as a whole.

The Board had an approved staff complement of 259 employees at the year end. This represents an increase of 18 during the year, largely made up of personnel hired for a limited period to carry out the conversion to the new data processing system. Of the total staff, 199 were located in Calgary, 57 in the Board's area offices and eight in the Chemical Laboratory and Northern District office in Edmonton. The actual number of employees at December 31, 1965 was 252.

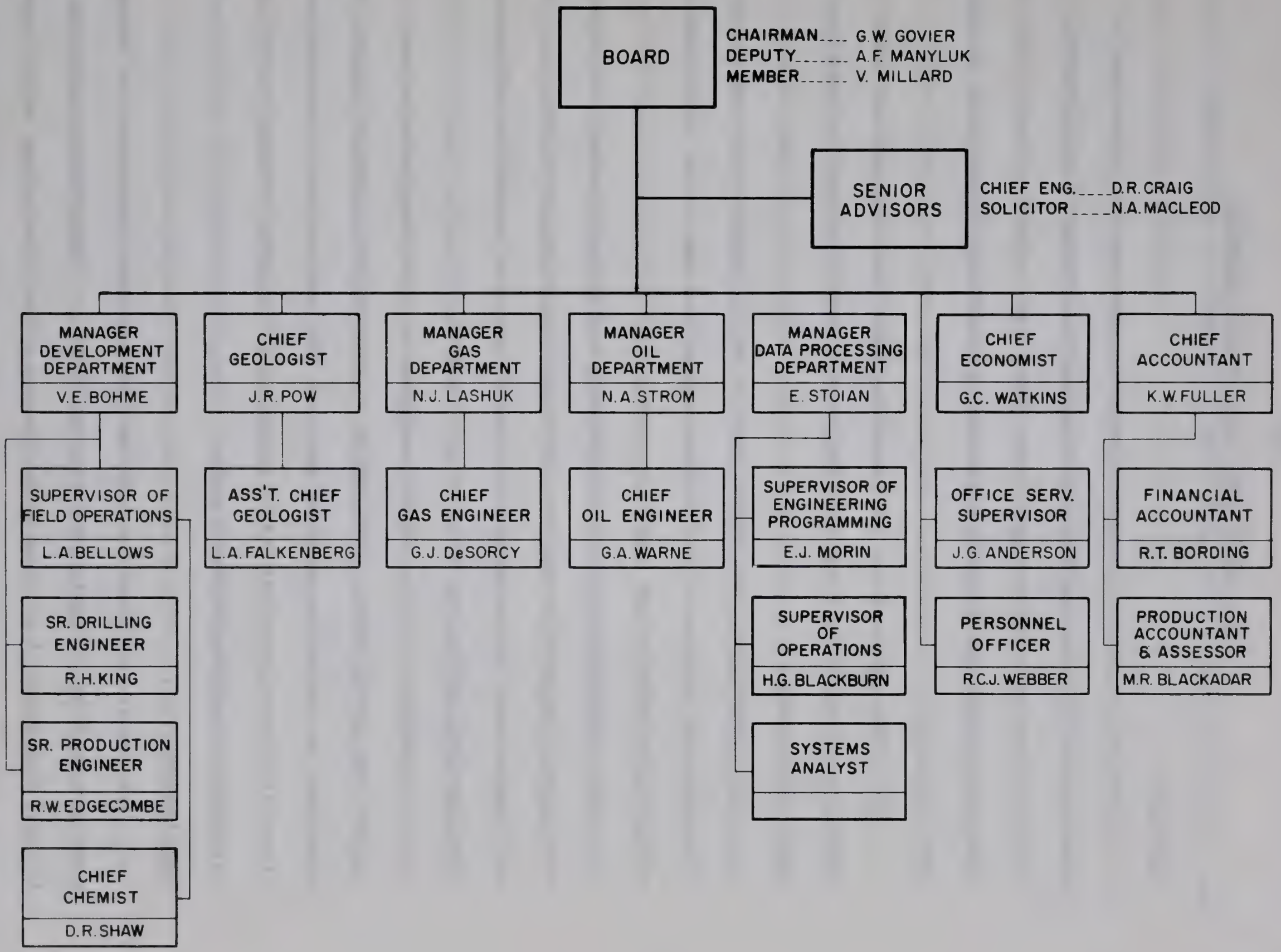
During the year, the Board's employee development program was continued. Five on-premises courses were provided in 1965. Dr. J. E. Weinrich of the University of Alberta at Calgary gave a

course in management and supervision and Dr. A. M. Neville of the University of Alberta at Calgary lectured on Statistical Methods. The other three courses were given by Board staff. In addition, the Board provided financial assistance for 93 employees who attended off-premises courses during the year.

The staff turnover during the past year amounted to 78 employees or 31 per cent of the total Board complement. This compares with a turnover of 29 per cent in 1964 and 24 per cent in 1963. An analysis of the 1965 turnover shows that 43 of the 78 employees who resigned were female employees. Ten employees resigned to continue their education. The remaining turnover of 25 is largely related to the technical classifications, including Engineers, Geologists, Engineering Assistants and Field Technicians and is indicative of the strong industry demand for such personnel.

OIL AND GAS CONSERVATION BOARD

BOARD ORGANIZATION



MAY 1, 1966

IV STATUTORY AND POLICY CHANGES

Statutes

The Oil and Gas Conservation Act (chapter 63, Statutes of Alberta, 1957) was amended by chapter 65, Statutes of Alberta, 1965. Some of the changes arose from the introduction of the new plan for proration of oil to market demand and these were as follows:

(1) The definition of "spacing unit" was struck out and definitions of "drilling spacing unit" and "production spacing unit" were added.

(2) Provision was added that a well licence does not authorize the use of the well for production unless it is the producing well of the production spacing unit.

(3) Provisions for establishing drilling spacing units were rewritten and provisions for establishing production spacing units and blocks and for establishing rules for the formation of production spacing units and blocks were added.

In addition to the above amendments, amendments were made to expand the provisions under which recovery enhancement schemes are approved to recognize development of the new recovery techniques since 1957 when the Act was passed. Also, some minor routine and corrective amendments were made.

Regulations

The Rules of Practice of the Oil and Gas Conservation Board were amended by Alberta Regulation 30/65. Examiners appointed by the Board now have the same powers under the Rules in the conduct of a hearing as the Board itself would have. The time at

which a submission is deemed to have been filed with the Board was more precisely defined.

The Drilling and Production Regulations under The Oil and Gas Conservation Act were amended in 1965 by Alberta Regulations 54/65, 221/65, 447/65, 533/65 and 571/65. Alberta Regulation 54/65 amended section 58, which sets out the periods for which data filed with the Board are confidential, to provide in greater detail for the well information obtained in the operation of experimental schemes or the drilling of oil sands test holes. In Alberta Regulation 221/65, the definition section of the regulations was rewritten to fit in with the definition changes made in the Act. By Alberta Regulation 447/65, section 7, subsection (6) was amended to make it clear that, where half section spacing is prescribed, the off-target area factors will be those set out in the regulations rather than ones that might be prescribed by the Board; some of the fire prevention provisions of section 40 were amended so that they could be modified in heavy oil pools; section 38 was amended to reduce the number of copies of a well log to be filed with the Board from three to two; and the provisions of section 55 dealing with reports of new wells were clarified. Alberta Regulation 533/65 followed a re-examination of the Board's guide lines for designation of fields and pools and amended section 58 to specify more clearly the effect of such designations on the release of data. By Alberta Regulation 571/65, section 43 was again amended to provide further relief from application of some of its provisions to heavy oil pools.

During 1965, the General Regulations under The Oil and Gas Conservation Act were amended by Alberta Regulations 235/65, 260/65 and 441/65. The first two regulations amended the provisions dealing with production spacing units and blocks in the light of amendments that had been made to the Act and imperfections that had appeared since such provisions had been introduced in the fall of 1964. Alberta Regulation 235/65 also amended section 111 with regard to the naming of wells where drilling spacing units are less than a legal subdivision. The amendments made by Alberta Regulation 441/65 were for the purpose of clarification, and dealt with the production of control wells and new oil wells and the over- or under-production status of the producing well of a new production spacing unit.

Major Changes in Policy

On May 1, 1965, the transition period commenced in the establishment of the new plan for the proration of oil to market demand, which had been announced in July, 1964 (OGCB Report 64-10).

A new policy for maximum oil production rate limitation was announced by the Board (OGCB Report 65-3) in March, 1965, and put into effect during the following months.

During the year, a consistent practice of requiring the testing of gas wells was launched and, to guide operators in complying with the practice, the Board published a manual on the Theory and Practice of the Testing of Gas Wells (OGCB Report 65-10).

The limitation on the production of off-target gas wells was changed during the year. As a result, the off-target area factor is applied to the well's maximum daily rate of production instead

of its average daily rate of production.

Problems arising out of applications pursuant to The Gas Resources Preservation Act, 1956, for permits authorizing the removal of propane from the Province were before the Board in 1965 for the first time in three years. The Board formulated policies for the treatment of these problems and presented them in September in a report to the Lieutenant Governor in Council (OGCB Report 65-11).

During the year, the Board amended its policies regarding the timing and method of designating fields and pools and substantially reduced the dependence of information release on its field and pool designation rules.

Based on the findings of a Government Committee appointed to review policies affecting the use of subsurface waters for oil field pressure maintenance, changes were made in the conditions that are attached to licences for wells drilled to obtain water for injection to oil pools, particularly in areas of ground water shortage. Within the Government policy, wells in such areas may not be produced from above a depth of 500 feet and, if potable water is found below 500 feet, production of it may be restricted or prohibited if the water is required for farm or domestic use.

In May, the Board amended its requirements for abandonment of wells to give added protection against the abandonment of economically recoverable amounts of oil or gas.

V DUTIES, ORGANIZATION AND MAJOR ACTIVITIES OF BOARD DEPARTMENTS

This section of the report deals with the make-up and principal activities of the nine Board Departments. The technical departments are described first.

Before outlining the departmental activities, it is probably worthwhile to mention the overall activity in the consideration of registered applications. During 1965 the Board received some 450 applications of the type which it registers individually. This volume is slightly lower than prevailed in the previous year. Such applications are those which, if approved, would result in the issuance of a Board order, approval or permit. They are exclusive of routine applications such as those for drilling licences and well allowables which are processed on a day-to-day basis. Public hearings were held in connection with some 95 of the applications, 13 of them by Board members and the balance by examiners selected from among the senior staff and appointed by the Board. Approximately 110 of the applications were considered after giving public notice for objections and the balance were of a routine nature and dealt with directly by the Board and its staff.

Most of the Board departments are involved with the processing of applications from time to time. In fact, the functions related to applications form a large part of the work load of the Board organization. Many of the applications require extensive technical analysis and subsequent reports to the Board. The reviews of performance of approved schemes also demand consider-

able attention from the technical departments.

In addition to the foregoing, there are two other general activities in which the Board and its staff participated. One of these is contributing to the work of technical or legal committees of various government and industry organizations. Among the organizations having Board representation in 1965 were the provincial Mines Ministers' Conference, including the Interprovincial Petroleum and Natural Gas Committee, the Interstate Oil Compact Commission committees, an industry Core Storage Committee, the Alberta Petroleum Industry Training Service, the Petroleum Technology Course of the Southern Alberta Institute of Technology, the War Supplies Agency of the Department of Defence Production, the Emergency Measures Organization and The Federal Provincial Oil and Gas Statistical Committee. The second activity is in providing limited and specialized on-the-job training to staff members of oil and gas conservation agencies of other governments. Requests for this service are frequently received through the Government of Canada under the Colombo Plan, but occasionally are made directly by a foreign or Commonwealth government. In 1965, this type of training was provided for one nominee from each of India, Australia and France, and for two from Nigeria.

A DEVELOPMENT DEPARTMENT

The Development Department is responsible for most matters within the Board's jurisdiction concerning the drilling, completion and producing of wells.

Headed by V. E. Bohme, Manager, the Development Department is divided into three main sections; the Drilling Division, under

the Senior Drilling Engineer, the Production Division, under the Senior Production Engineer, and the area offices, supervised by the Northern District Engineer and the Southern District Engineer. The responsibilities, functions and organization of each of these is described in more detail below.

(a) Drilling Division

Responsibilities and Functions

This division's main responsibilities are to ensure the proper location of wells, to reduce the possibility of subsurface contamination and blowout hazard by specifying proper procedures for casing, cementing and abandoning wells and, through inspections by the field staff, to ensure that drilling operations are conducted so that the possibility of waste is minimized.

The major functions of the division are

(1) to process applications to drill, suspend rework, plug back or abandon a well; to specify casing, cementing and completion practices; to review directional surveys and assess area factors for off-target wells;

(2) to appraise and make recommendations to the Board regarding the disposition of applications for special drilling spacing units, compulsory pooling of drilling spacing units and relief from application of area factors for off-target wells;

(3) to maintain files and records respecting

well names and changes thereto, unit agreement areas, well licences, well licence transfers, amendments and cancellations, and appointment of agents; and

(4) to review drilling and service rig inspection reports from the Board field staff, and correspond with contractors regarding the recommendations arising from the rig inspections.

Organization and Staff

The division is both technical and clerical and is headed by the Senior Drilling Engineer who is responsible to the Manager of the Development Department. The staff complement at December 31, 1965 was as follows:

Senior Drilling Engineer, R. H. King	1
Assistant Drilling Engineer	1
Engineering Assistants	3
Stenographer and Typist	2
Total	7

Activities During the Year

Seventy registered applications to the Board were dealt with by the division as compared to 60 in the previous year. Of this number, 57 related to off-target area factors, 2 to compulsory pooling, 4 to suspension of target area and drilling spacing unit regulations, and 4 to establishment of special drilling spacing units. Fifteen of these applications were considered at public hearings.

Applications for 2,270 drilling licences were examined and recommendations made to the Minister of Mines and Minerals for issuance of licences. This is a substantial increase over the previous year's total of 2,050. A large number of amendments to the official Well Name Register were made to record changes of well names and transfers of well licences.

A study was initiated of casing and cementing specification and procedure for high temperature conditions encountered in steam stimulation projects. Review studies were commenced regarding improvement of blowout prevention equipment and methods, criteria for approval of used casing, and completion techniques in areas of serious lost circulation.

Two blowouts occurred where complete loss of well control resulted. The Board's staff maintained close surveillance in each instance to ensure public safety and to see that control of the well was regained promptly without additional hazard to the well or to property. Five instances of partial loss of well control were reported. One serious fire occurred during drilling operations, resulting in one fatality, and there were five minor fires from which no serious injury or loss of oil or gas resulted. In each case, a full report was made to the Board in which the reasons for the blowout or fire were given and recommendations made for suitable follow-up action by the Board.

(b) Production Division

Responsibilities and Functions

The Production Division's major responsibility is to ensure accurate measurement of produced or injected reservoir fluids,

both on a pool-wide and individual well basis. The division is also responsible for such matters related to production as control of air, water and soil pollution and physical waste, approval of new types of production equipment, disposal of produced water, approval of multizone completions and control of flow lines which are common to two or more wells upstream from measurement facilities.

The principal functions of the division are

(1) to co-ordinate field staff inspections of measurement practices, well testing procedure and production accounting and correspond with the operators regarding the results of these inspections; to perform periodic audits of company production accounting methods at their major offices;

(2) to deal with requests for exemption from gas measurement for wells or pools;

(3) to appraise applications for water disposal schemes and recommend disposition of them; to review disposal methods for produced water, and recommend volume restrictions for surface disposal where necessary; to review field reports regarding air, water and soil pollution and require operators to take the necessary steps to curb air pollution from well

production facilities;

(4) to process applications for multizone completions and common flow lines and schedule and evaluate segregation tests on multiple completions; and

(5) to co-ordinate and follow up area office inspections of producing and abandoned well sites and batteries.

Organization and Staff

The organization of the division is similar to the Drilling Division and is headed by a Senior Production Engineer who is responsible to the Manager of the Development Department. The staff complement at December 31, 1965 was as follows:

Senior Production Engineer, R. W. Edgecombe	1
Production Engineers	2
Engineering Assistants	2
Stenographer	1
Total	6

Activities During the Year

Applications for 30 new subsurface salt water disposal schemes and for increases in the authorized disposal rates of 19 other schemes were processed during the year. Approved subsurface water disposal capacity in the Province increased in 1965 from 6.0 million to 6.7 million barrels per month, while use of these facilities declined from a rate of 3.5 million to 2.3 million barrels per month.

Where volumes of salt water disposed of to surface facilities increased to a potential pollution level, or where adequate subsurface facilities were available, the division reduced the amount of surface disposal permitted in 27 fields, to ensure that contamination of soil and potable water supplies would not occur.

The quality of fluid measurement improved during the year. Special emphasis was directed to water measurement, which will require further improvement. In order to maintain the desired quality of gas measurement, the field staff continued to check meter chart reading, derivation of meter coefficients and general production accounting practices. A program implemented in 1964 to review production accounting and chart reading practices of each operator on a regular basis progressed as scheduled. Selected records of 95 of the 150 operators in the Province were audited. A similar program was established to provide periodic checks on the production practices at each battery in the Province. Also, a project was initiated to improve the accuracy of oil field gas measurement by obtaining more precise data on the specific gravity of gas produced. Well owners in selected pools were asked to obtain accurate measurements of gas gravities at selected wells and the data obtained will be analyzed and correlated on computer facilities to provide improved specific gravity coefficients for gas volume calculations.

During the year, 41 wells were dually completed and 12 restored to single zone status, bringing the year-end total of dual completions to 334. Semi-annual segregation tests on each well were analyzed to ensure continued segregation of the zones.

Twelve cases of commingling between zones were detected by the tests, and the necessary steps taken to regain segregation.

Air pollution complaints were infrequent during 1965. The few complaints received resulted from sulphurous odours occurring when battery flares went out. In all cases, prompt remedial action was taken. Very few contraventions of the special regulations for high hydrogen sulphide areas were noted. Battery conditions in these areas were generally satisfactory and the odour level much reduced.

(c) Area Offices

Responsibilities and Functions

During the year, the Board decided to replace the old term "field office" by "area office" to more accurately describe the region of responsibility. The chief duties of the area offices are to ensure that The Oil and Gas Conservation Act, the regulations thereunder, and the various other requirements of the Board are observed by the industry at the field level. The area offices act as information gathering agents and in some instances as a liaison body between the landowner and the oil company.

To carry out these responsibilities, there are a number of separate duties which together comprise most of the work load of the area offices. The major duties are

(1) to issue or approve abandonment and casing programs and advise operators on the requirements of the Act and regulations and Board policy to field operations;

(2) to inspect wells, batteries, measurement equipment and drilling and service rigs; to witness a representative number of dual completion operations, segregation and back pressure tests;

(3) to carry out subsurface pressure measurements, calibrate pressure instruments, and gather representative samples of oil, gas and water for analysis;

(4) to check operators' production practices and reporting procedures and make reports on gas processing plants, salt water disposal systems, pressure maintenance projects and gas conservation schemes; and

(5) to prepare weekly drilling progress and rework reports.

Organization and Staff

For the purpose of administration, the Province is divided into two main areas, the Northern District and the Southern District, each headed by a District Engineer who reports to the Manager of the Development Department. The Northern District Engineer supervises area offices located at Devon, Redwater, Drayton Valley and Camrose. Medicine Hat, Red Deer and Black Diamond offices are responsible to the Southern District Engineer, located in Calgary. Mr. P. D. Larbalestier has continued as Acting Northern District Engineer and Mr. R. W. Edgecombe has continued as Acting Southern District Engineer in addition to his

regular duties as Senior Production Engineer.

The staff at each area office normally consists of an engineer in charge, an assistant engineer in the larger offices and a number of technicians. The staff at the smallest office consists of 3 technicians, while the proposed Edmonton office will be staffed by 4 engineers and 18 technicians. During the year, engineers in charge of the Medicine Hat and Black Diamond offices were replaced by experienced senior field technicians. These replacements released engineers for duties in the Calgary engineering departments to perform duties of greater technical content. As of December 31, 1965, the total field staff consisted of 5 engineers (including the Northern District Engineer), 41 technicians and 8 stenographers.

Activities During the Year

Drilling activity continued at a rapid pace during 1965, necessitating a large number of inspections of drilling operations. Over 1,800 inspections of drilling and service rigs were made during the year, primarily to ensure proper operation of blowout prevention equipment and also to ensure compliance with regulations for fire prevention, crew safety, pollution control and reporting of well information. Other aspects of drilling, such as well abandonments, casing jobs and used casing were checked for compliance with the regulations through 325 inspections.

The number of operating oil wells reached a peak in March and declined steadily until the end of the year, due to formation of production spacing units and closing in of surplus wells. The number of batteries remained constant during the year, although

several new fields were developed. This levelling-off was caused by operators following the general trend to building larger batteries and consolidating batteries concurrent with the formation of production spacing units. Inspection of producing operations occupied a major portion of staff time as indicated by 5,800 inspections of leases, 1,800 inspections of batteries and gas well installations, 3,000 inspections of gas meters and 580 oil meter inspections. Particular attention was given to water measurement during the year, accounting for 2,150 inspections of water meters. To check on the accuracy of production accounting practices, audits were made of production reports of approximately 1,700 oil and gas wells. 206 reports were written on salt water disposal facilities, gas processing plants, sour gas areas and small utilities. Inspection of field facilities of pressure maintenance projects and the witnessing of segregation tests on dually completed wells accounted for 130 reports from the field staff.

The field staff gathered 250 oil, gas and water samples for analysis by the Board's Chemical Laboratory, measured bottom hole pressures in 646 wells and calibrated 1,170 pressure recording instruments.

The re-abandonment of two old wells in the Medicine Hat area, MedHat #14 and Mitchell Farm Gas Well, was undertaken during 1965, as both wells were leaking gas from the Milk River zone. Total cost of the two projects amounted to approximately $13,000, borne by the Department of Mines and Minerals.

B OIL DEPARTMENT

Responsibilities and Functions

The Oil Department is responsible for matters affecting conservation and correlative rights in crude oil production operations, including the study and surveillance of enhanced recovery operations, assessment of reserves and productive capacity of oil pools, oil well spacing, oil sands schemes, experimental schemes and technical matters relating to the proration plan.

The principal functions of the Oil Department relate to reservoir engineering and are

(1) to determine oil reserves, reserves growth trends and maximum rate limitations of production;

(2) to review the performance of all oil pools and enhanced recovery schemes therein, and recommend to the Board means of improving conservation in pools where it is feasible;

(3) to assess applications for enhanced recovery schemes or pilot tests and oil sands experimental schemes, and to co-operate with other departments in assessing applications concerning salt water disposal, concurrent production, and production measurement;

(4) to assess applications respecting oil well drilling spacing units, production spacing units, blocks and projects;

(5) to co-ordinate measurements and maintain records of subsurface pressure surveys of oil pools in the

Province, and

(6) to initiate Board orders for fields and pools, to establish minimum allowance allocations of production spacing units, blocks and projects, and to advise the Economic Studies Department in the preparation of the monthly crude oil production allowable order.

Organization and Staff

The Oil Department staff includes 12 engineers, 15 technical-clerical assistants, one stenographer and one typist. The engineering staff is organized in three divisions. The Reserves Division is responsible for evaluation of reserves, recovery factor modifiers and maximum rate limitations (MRL's) and assessment of applications for alteration of oil well drilling spacing units and establishment of production spacing units, blocks and projects. The Projects Division is responsible for evaluation of proposed enhanced recovery schemes and surveillance of enhanced recovery operations. The Oil Sands Division is responsible for oil sands and heavy crude oil experimental schemes. The clerical-technical group provides assistance to each engineering division, prepares basic technical data and performs routine Board administrative duties. The staff complement at December 31, 1965 was as follows:

Manager, N. A. Strom		1
Chief Oil Engineer, G. A. Warne		1
Senior Engineers -	H. N. Collins R. G. Evans D. G. Pearson H. J. Webber	4

Other Engineers	6
Engineering Assistants and Clerks	15
Stenographers and Typists	2
Total	29

Activities During the Year

The Oil Department dealt with 257 registered applications in 1965 (as compared with 305 in 1964) of which 55 resulted in public hearings. Of the total number of applications considered, 146 related to matters of enhanced recovery and 49 dealt with well spacing. The balance pertained to reserves of pools, recovery factor modifiers, oil sands schemes, experimental schemes, good production practice status, credit for water injected in calculation of gas-oil ratio (GOR) penalties and exemption from certain provisions of the General Regulations respecting crude oil production. The first annual Board hearing on ultimate reserves was held in February, 1965 and involved consideration of some 80 separate submissions. Board orders and approvals initiated by the Oil Department totalled in excess of 400.

About 1,900 letters of request were processed during the year. Most of these were non-registered applications respecting production spacing units, blocks and projects, minimum allowance allocations for blocks and projects, ultimate reserves and recovery factor modifiers of pools and wells, terminal transfer, concurrent production, credit against GOR for net water injected, GOR penalty changes and heavy crude MRL's.

Initial or revised reserve evaluations for about 100 pools of a total of some 400 designated oil pools in the Province were

completed. Pool performance records for 338 pools were maintained from which pool performance charts for 127 pools were prepared. Pool productivity predictions for 96 of the more significant pools in the Province were up-dated on the basis of revised reservoir factors adopted following the first annual reserves hearing. Some 80 separate studies of reservoir rock and fluid properties were completed using data provided by the industry of oil-base and other special core analyses and of analyses of the pressure, volume and temperature behaviour of reservoir fluids.

The concepts adopted in the new proration plan (Board Report OGCB 64-10) and the new plan for maximum rate limitation (Board Report OGCB 65-3) are reflected in an increased emphasis by well owners and the Board staff on the efficiencies of various fluid displacement mechanisms. In the Reserves Division, studies of capillary behaviour and relative permeability characteristics of several important pools were completed and a dozen studies of important reservoirs were carried out, with emphasis on gas and water interface advance behaviour. The Projects Division, in addition to evaluating the numerous enhanced recovery schemes applied for by well owners, initiated recovery stimulation feasibility studies for a number of pools. In those instances where recovery enhancement appeared practical and was not proceeding, the pool operators were asked to make comparable studies and report their findings, and appropriate follow-up measures were taken to ensure maximum practical crude oil recovery.

Water flooding continued to be the most common method of recovery stimulation and, except for certain experimental schemes

and the tests of the steam soak method in the Lloydminster Field, no significantly improved methods of crude oil recovery were initiated during the year.

The Oil Sands Division carried out most of the technical and administrative work of the Department related to oil sands experimental schemes and experimental schemes in heavy crude oil pools. Of the first mentioned, there were five schemes proceeding at the year end, all but one of which were started in 1964. In the heavy oil category, six new experimental schemes were approved and commenced operation in 1965 and one commenced in 1964 continued to operate through 1965.

Beginning in May, 1965, the industry quickly put to use the concept of production spacing units adopted under the new proration plan. About 1,100 production spacing units were established during the year, all of them in pools in the light and medium crude oil category, and containing in aggregate about 200,000 acres. This permitted shutting in some 1,100 wells not needed for deliverability purposes and reduced substantially the number of wells which might otherwise have been drilled in newly developing pools. The clerical-technical group, in addition to its routine duties, carried out the greater part of the administrative work arising in connection with PSU's, blocks and projects and the provisions of the new proration plan.

The clerical-technical group evaluated and compiled some 700 core analyses, 3,900 bottom hole pressure measurements, 1,300 fluid level measurements and 1,600 subsurface pressure gauge calibrations, most of which were obtained and filed with the Board by

well owners. Some 700 of the pressure and fluid level measurements were made by the Board field staff and processed in the Department. The initiation of an integrated program of Province-wide bottom hole pressure surveys resulted in a 90 per cent increase over the previous year in calibrations of subsurface pressure gauges by the Board staff and a 50 per cent increase in the number of pressure measurements taken by industry units. Under the program, the Board subsurface pressure measuring units were used largely for checking and the number of measurements taken by these units declined 40 per cent.

C GAS DEPARTMENT

Responsibilities and Functions

The Gas Department is concerned with the conservation of gas and related products, including propane, butanes, pentanes plus and sulphur. In addition, the department is responsible for the determination of the reserves and deliverability of gas, natural gas liquids, and sulphur, and for assessing the availability of gas to meet requirements of the various utility systems in the Province.

Specifically the department has the following functions:

(1) in the administration of The Oil and Gas Conservation Act

  (a) to establish permissible rates of production for certain gas wells, determine frequency of gas well tests and prescribe methods of testing wells and calculating flow potentials;

(b) to review the production performance of all gas pools;

(c) to carry out studies with regard to the establishment of gas conservation schemes;

(d) to review the performance of gas processing facilities, and review regularly, at the request of the Public Utilities Board, the requirements for and availability of gas to the smaller gas utility systems;

(e) to review, at the request of the Department of Mines and Minerals of the Provincial Government, applications to construct pipe lines and to advise the Department of the Board's findings;

(2) in the administration of The Gas Resources Preservation Act

(a) to calculate reserves in all pools in the Province of gas, propane, butanes, pentanes plus, condensate and sulphur; to assist the Board in assessing applications for removal from the Province of gas and propane;

(b) to determine the deliverability of gas produced from fields connected, or expected to be connected, to intraprovincial and extraprovincial markets at such times that applications for removal of gas from

the Province are considered by the Board; and

(c) to determine the availability of propane in the Province at such times as applications for removal of propane from the Province are considered by the Board.

Organization and Staff

The department is primarily technical in nature, and is headed by the Manager. The assistant department head is the Chief Gas Engineer who is responsible for the day-to-day operations of the department. A section head, the Reserves Engineer, oversees and co-ordinates the evaluation of gas reserves. The staff complement as of December 31, 1965 was as follows:

Manager, Gas Department, N. J. Lashuk	1
Chief Gas Engineer, G. J. DeSorcy	1
Senior Engineers - A. L. Telford L. J. Schneider	2
Other Engineers	4
Engineering Assistants and Clerks	6
Stenographer	1
Total	15

Activities During the Year

The department considered some 90 registered applications during the year, about 20 of which resulted in public hearings. The applications dealt with matters such as gas processing, cycling, allowables, water disposal, measurement and removal from the Province of propane and gas.

The more significant applications considered were

(1) partial cycling schemes utilizing idle plant capacity in the Crossfield, Waterton and Turner Valley Fields,

(2) removal from the Province of small volumes of gas from the Medicine Hat, Chancellor, Severn Creek and Twining North areas,

(3) expansion of processing facilities in the Nevis, Windfall and Crossfield-Calgary plants.

Propane was the subject of considerable interest in 1965. The department made studies to determine the reserves and availability of propane in Alberta, and the manner in which the propane requirements of persons in the Province could be met. The studies were necessary to assist the Board in its consideration of three applications for the removal from Alberta of some 67 million barrels of propane.

In addition to studies made for the major applications, the department investigated the economics of conserving oil field gas in a number of fields, the performance of existing conservation schemes, the efficacy of cycling schemes and a number of smaller projects.

During the year the department prepared approximately 100 approvals and orders, issued pool performance charts for 116 gas pools and processed some 800 to 900 back pressure tests. Maximum daily rates of gas production (Qmax) were calculated for some 700 wells. Charts showing the performance of 35 gas processing plants were published.

For the annual publication of reserves, the department made detailed studies of some 300 gas pools. Comprehensive reservoir studies were prepared for 16 fields to determine the need for and the factors to be used in the calculation of average or maximum daily rates of gas production.

The Gas Department completed its studies with respect to back pressure testing of gas wells and prepared a revised edition of "The Theory and Practice of the Testing of Gas Wells" (OGCB Report 65-10). In collaboration with the Data Processing Department, a thorough study was made of the many factors affecting the ultimate recovery of gas. The report on the studies entitled, "Natural Gas Recovery Factors," was approved by the Board for the use of its staff.

D GEOLOGICAL DEPARTMENT

Responsibilities and Functions

The Geological Department is responsible for the preservation and evaluation of certain well data, the administration of the Board's well evaluation requirements, the mapping of oil and gas reservoirs and the preparation of subsurface geological maps. The department also makes special studies, related to these responsibilities, to assist other Board departments and the Alberta Department of Mines and Minerals. The Core Storage Center provides for the processing, storing and public examination of all core and important drill cuttings recovered from wells drilled in the Province. The Drafting Section of the Geological Department is responsible for the preparation of all maps, charts and graphs, and all general drafting for the Board organization.

The main functions of the department are

(1) to administer the coring, logging, drill stem testing and drill cutting requirements of the Board and to collect and store logs and drill stem test charts;

(2) to receive, process and provide examination facilities for drill cuttings and core at the Core Storage Center;

(3) to evaluate hydrocarbon-bearing intervals at all productive wells and prepare maps to delineate the area and volume of each pool;

(4) to identify, record and publish the names and depths of the stratigraphic markers penetrated by all wells drilled;

(5) to investigate and report on the geological aspects of submissions or other evidence filed with the Board;

(6) to advise the Board, other Board departments, and the Department of Mines and Minerals on geological matters;

(7) to assist the Development Department in ensuring that a well drilled to supply an oil field water injection scheme does not interfere with domestic water supplies;

(8) to maintain geological, cross-sections, well location and status maps for sale and on-premise use;

(9) to classify each well licensed in accordance with

the Lahee classification system; and

(10) to provide all drafting services necessary for the Board's functions.

Organization and Staff

The Chief Geologist is the head of the Department as well as being Chief Geologist of the Alberta Department of Mines and Minerals. He and his assistant spend part of their time supervising or making special studies in addition to their administrative duties. Within the Geological Department there are three distinct groups. The staff complement at December 31, 1965 was as follows:

Chief Geologist, J. R. Pow	1	
Assistant Chief Geologist, L. A. Falkenberg	1	
		2
Geological Group		
Evaluation Geologist, F. Phillips	1	
District Geologists	3	
Regional Geologist	1	
Geologists	5	
Geological Assistant	1	
Stenographer and Clerks	3	
		14
Core Storage Center		
Supervisor, A. H. Shepard	1	
Assistant Supervisor, Core Handlers and Laboratory Assistants	8	
Receptionist - Typist	1	
		10

Drafting Section

Chief Draftsman, D. H. Hannah	1
Draftsmen	5
	6
Total	32

With the Geological Group, the Evaluation Geologist is responsible for evaluation studies. He is assisted by District Geologists who are responsible for their respective districts. The District Geologist co-ordinates reserve mapping, marker determinations, special investigations and supervises the geologists who are assigned to his district. In addition to the foregoing complement, one geologist worked on regional projects for a part of the year.

Activities During the Year

(1) Geological Group

Stratigraphic markers were identified, recorded and published for over 2,000 wells. Hydrocarbon-bearing zones were evaluated for some 1,150 productive wells drilled during the year and the reserve maps were prepared or revised as required. In addition, some 35 fields or pools were re-studied on the basis of new evidence.

Approximately 300 operators' applications or submissions were investigated with respect to reservoir continuity, pool delineation, pay thickness, acre or acre-footage factors and porosity distribution. Many of the investigations involved discussions with the operators. Applications for production spacing units accounted for about half of the total. The remaining studies

were of applications or submissions relating to oil and gas reserves, pool delineation, special drilling spacing units, off-target or gas-oil ratio penalty relief, and pressure maintenance or enhanced recovery.

At the request of the Department of Mines and Minerals, 700 P. & N. G. leases were evaluated for Crown reserve sales, 200 P. & N. G. reservation reports were reviewed and 20 applications for gas lease credit were processed. In addition, 75 zone designations were prepared and particulars submitted on 20 wells with offset drilling obligations. Several meetings were held with operators to discuss matters related to gas lease selection and zone designations.

Ten area maps showing contours on the base of the Fish Scale horizon were revised, published and consolidated into a small-scale composite map covering the Province.

Throughout the year, preliminary work in establishing a geological data storage and retrieval system continued to progress. To date, codes have been developed for all stratigraphic names and spread sheets have been designed for recording geological markers. A representative from the Department served on two subcommittees which were organized with representatives from the industry to develop a unique well identification number and location system and to standardize formats for geological and pool data.

Miscellaneous activities included the geological classification of over 2,000 wells, determination of casing requirements for 100 water supply wells, collection of stabilized water levels for about 450 wells, investigation of near-surface gas blowouts for

areas where test hole applications were received, examination of 240 abandonment applications and consideration of some 50 requests for approval of special logging or coring programs. Numerous public enquiries were answered and technical advice was, when requested, submitted to the Alberta Securities Commission.

(2) Core Storage Center

To carry out a 1964 decision to store all full diameter core in good condition, a 22,000 square foot extension to the Center was built by the Department of Public Works. This extension increased the capacity of the Center from about 285,000 to 475,000 core boxes, each of which contains about five lineal feet of core. The extension will accommodate the 100,000 boxes of backlog core now stored by the industry and provide for normal future needs.

To provide maximum storage efficiency, size specifications on core boxes were introduced at the beginning of the year. In most cases, 40 per cent or greater space is being gained by this policy.

Approximately 24,000 boxes of recently cut core were accepted during the year. In addition, some 200,000 sets of drill cuttings were washed and dried. Each set was split and packaged in duplicate to provide cuttings for both the Board and the Geological Survey of Canada.

An average of about 15 geologists from industry visited the Core Storage Center each working day to examine core and drill cuttings.

During the year, the Core Storage Center's inventory records of core and drill cuttings were key-punched on computer cards.

(3) Drafting Section

The drafting of illustrations for published Board reports and preparation of base maps for areas of oil field development accounted for a large part of the section's work. There was a considerable increase in drafting special forms, graphs and charts for the Data Processing Department in preparation for the applications of the new computer. Preliminary studies on mechanical plotting were continued during the year.

E DATA PROCESSING DEPARTMENT

Responsibilities and Functions

The Data Processing Department is responsible for carrying out systems planning, program development, electronic machine operations, staff training and information, and for surveying electronic data processing activities and new equipment development.

More specifically, the functions of the department are

(1) to analyze existing and proposed manual and electronic data processing systems with a view to designing and implementing new data systems, improvements and innovations;

(2) to analyze and appraise computer applications;

(3) to write engineering, accounting, statistical and economic programs as required by the work of the organization;

(4) to conduct effective closed-shop programming by educating staff and maintaining an appropriate program library;

(5) to accurately process data received from various departments in order to obtain statistics for internal use or publication;

(6) to perform computer calculations for geological, and oil and gas engineering evaluations as well as special studies;

(7) to advise the Board on computer technology;

(8) to familiarize supervisors and personnel throughout the organization with computer applications and data processing;

(9) to complete special studies as required.

Organization and Staff

The Manager, Data Processing Department, directs all department functions.

A mid-year re-organization of the former Special Studies and Programming Department and Tabulating Department into the Data Processing Department resulted in a functional division of staff. Staff familiar with the organization's functions comprise the Systems and Procedures Task Force, and the Business Programming Task Force. The Engineering Programming Division assumes the responsibilities of the programming group in the former Special Studies and Programming Department. The Operations Division is responsible for all functions related to electronic machine processing. Appropriately selected staff from other departments assist in the completion of special studies. The staff complement at December 31, 1965 was as follows:

	Permanent	Transition Period
Manager, Data Processing Department, E. Stoian	1	
Supervisor of Operations, H. G. Blackburn	1	
Supervisor of Engineering Programming, E. J. Morin	1	
Systems Analyst	1	
Systems and Procedures Task Force		
Engineers		2
Geologists		1
Technicians		1
Engineering Programming Division		
Engineers	1	
Programmers	1	
Business Programming Task Force		
Programmers	1	
Accountants		1
Operations Division		
Machine Operators	3	
Key Punch Operators	5	5
Stenographer	1	
Seconded Staff - Special Studies		1
Total	16	11

Activities During the Year

Late in 1964, a study was undertaken for the purpose of evaluating the desirability of implementing an integrated data processing, storage and retrieval system for increased efficiency

and economy. This study culminated at mid-year when the Board decided to enter into a contract for a new computer system and, incidentally to this, re-organize the department.

The decision to rent a new computer installation, IBM System/360 Model 30 to replace the LGP-30 and Univac 1004 Systems necessitated the following special activities.

In 1965, a special "Systems and Procedures Task Force" was established consisting of one representative from each of the Development, Geological, Gas and Oil Departments. This task force, assigned primarily to develop the Board's Well Data Storage and Retrieval System, has

(a) completed several courses in the field of computer technology and systems design;

(b) reviewed the organization's procedures and work volumes;

(c) determined the content of the basic well data file;

(d) examined existing well data systems in consultation with industry and finalized file organization and data acquisition; and

(e) planned a comprehensive system that would provide computer access to basic well data, production data and certain reservoir rock and fluid parameters used by the Board staff.

In addition, considerable effort was directed towards preparing oil and gas reservoir charts by computer.

The Business Programming Task Force commenced conversion, modification, extension and maintenance of non-technical process-

ing systems. These include production statistics and allowable calculations. The force proceeded with

(a) self-education in computer oriented systems;

(b) analysis and documentation of the present production accounting procedures; and

(c) determination and documentation of the new system requirements.

The Engineering Programming Division has developed and maintained technical computer programs required by the Board's organization. In preparation for the conversion to the new system, the staff assigned to this division has completed the necessary courses in computer technology, programming languages, systems and plotting, and commenced using off-premise computer facilities for selected new computer applications. It has also initiated conversion of existing computer programs and at the year end thirteen programs had been converted. In addition, this division has continued to maintain the present facilities by program modifications and completion of eleven extension programs.

The Operations Division has encoded data and processed both business and engineering applications on improved schedules. The Univac 1004 System processed routine business applications in connection with

(a) oil proration to market demand;

(b) battery proration;

(c) production summary and disposition;

(d) service well statistics;

(e) enhanced recovery statistics;

(f) oil allowables; and

(g) assessment and notices for oil and gas property tax.

Seven additional processing routines of varying complexity were developed. The Board's regular quarterly and semi-annual reports on producing and service wells, and pool statistics were compiled and printed.

Approximately 10,000 applications were processed on the LGP-30 computer in the field of engineering, statistics and economics. This computer was used in excess of two shifts.

The Division has designed and maintained all programs for the Univac 1004 System. In preparation for the new computer system, the Division has undertaken the training of key staff for the operation of the new computer and peripheral equipment and the design of offices for the new system and associated staff. Planning for the physical installation and operation of the new computer system was proceeding at the year end.

Special studies initiated previously have continued. A detailed study of recovery factors for natural gas was made in conjunction with the Gas Department. The report on the study was adopted by the Board as its primary guide for staff procedures in determining gas recovery factors. A study undertaken to predict oil well productivity continued throughout the year. Correlations of actual water-oil ratios and gas-oil ratios with reservoir and well parameters in selected pools neared completion.

A review of existing well data retrieval systems, emphasizing geological information, resulted in a report for use as a reference by the Systems and Procedures Task Force.

During the early part of the year, the Department made a number of analyses of the evidence and other data related to the Board's study of the need for oil production rate limits, and assisted in developing the Board's new Plan for Maximum Oil Production Rate Limitation (Report No. OGCB 65-3).

F CHEMICAL LABORATORY

Responsibilities and Functions

The staff of the Board's Chemical Laboratory, located in the Engineering Building at the University of Alberta in Edmonton, is generally responsible for the selection and analysis of samples of oil, gas and water which are representative of the fluid content of various formations in the fields and pools in Alberta. In addition, it obtains either the results of analyses from well owners or analyses samples taken by the owners. From all data sources, representative analyses for most of the productive zones are selected and published as soon as they become non-confidential. The department also performs any special investigation of a chemical nature which is related to production, disposal, or pressure maintenance in oil and gas pools, as the need arises. By arrangement with the University, certain facilities are made available to the University, and the Chief Chemist provides a limited amount of assistance in connection with research projects of both the University and the Research Council of Alberta.

Organization and Staff

The department is generally technical in nature although a considerable amount of clerical work is done. All operations are supervised by the Chief Chemist. Routine analyses are carried

out by trained technicians.

The staff complement at December 31, 1965 was at its full strength of five, consisting of the Chief Chemist, two technicians and two typists.

Activities During the Year

The analysis of 459 water samples, 45 oil samples and 71 gas samples occupied the majority of the working time of the laboratory technicians. All data on drill stem tests made in the Province as well as initial production tests were checked for fluid contents, and samples of all clean fluids recovered either were analyzed or the analyses of them made by others were processed. A total of 2,400 analyses carried out on Alberta oil, gas and formation water by well owners and others were filed with the laboratory. The information on all analyses was checked, completed and compiled on cards which are used in preparation of the Board's fluid analysis publications and for general reference by the industry and Board staff.

G. ECONOMIC STUDIES DEPARTMENT

Responsibilities and Functions

The Economic Studies Department is responsible for economic analysis and evaluation, the compilation of statistics and preparation of the monthly proration order.

The main functions of the Economic Studies Department are

(1) in co-operation with the Oil and Gas Departments, to forecast demand and supply for liquid hydrocarbons, sulphur, and natural gas in the Province of Alberta;

(2) to prepare a five-year forecast of petroleum industry activity relative to the functions of the Board to serve as a basis for the Board's annual five-year expenditure and revenue forecast;

(3) to carry out special studies relating to economic aspects of conservation;

(4) in co-operation with the Oil Department, to carry out the monthly oil proration computations; and

(5) to compile statistical and other information covering all aspects of the oil and gas industry.

Organization and Staff

The department is headed by the Chief Economist, G. C. Watkins, who was appointed in January following the resignation of Mr. D. P. Saca. The staff complement at December 31, 1965 was at its full strength of five, comprising the Chief Economist, an economist, a senior and junior statistical clerk and one stenographer.

Activities During the Year

In addition to its routine activities, the department participated in studies arising from three separate applications to remove propane from the Province. In particular, this work involved the preparation of a detailed forecast of Alberta's requirements for propane.

In May, the inception of the period of transition to the new proration scheme necessitated considerable changes to the administration of the proration plan and the department was involved in the development of the requisite new procedures. In conjunction

with the Data Processing Department, an additional computer program for investment evaluation was developed to complement a previously written program.

The statistical functions of the department were expanded to encompass the preparation of the Board publication of data concerning units and conservation schemes. The department investigated the application of econometric methods to demand forecasting.

H ACCOUNTING DEPARTMENT

The Accounting Department's responsibilities are carried out under two separate divisions, financial accounting and production accounting. The Chief Accountant, K. W. Fuller, is the head of the department, and reports to the Board.

Financial Accounting Division

Responsibilities and Functions

The Financial Accounting Division is responsible for all general accounting and budget preparation. It assists in the collection of the Board's annual tax levy and provides the Board with all information for budget control.

The major functions of the division are

(1) to process all expenditures, receive all revenues and maintain all necessary records;

(2) to close the accounting records as at March 31 each year and co-operate with a representative of the Provincial Auditor in his annual audit;

(3) to prepare, in co-operation with the other departments, the budget for Board approval for the next fiscal year and prepare a five-year forecast of

expenditure and revenue;

(4) to provide the Board with monthly statements comparing budgeted and actual expenditure and revenue, to assist in the maintenance of control over expenditure and to establish current financial policy;

(5) to assist, in co-operation with the Assistant Assessor, in the collection and follow-up of outstanding tax accounts;

(6) to maintain records necessary to the control of all inventorial assets of the Board and to supervise the annual physical check of inventory items.

Organization and Staff

The Financial Accountant is the head of the division and is responsible to the Chief Accountant. In January, 1965, the Assessment Section was transferred from the Financial Accounting Division to the Production Accounting Division under the Production Accountant who was appointed the Board's Assessor. The staff complement at December 31, 1965 was as follows:

Financial Accountant, W. P. Williams	1
Clerks	4
Typist and Bookkeeping Machine Operator	2
Total	7

Activities During the Year

During 1965, the general accounting functions embracing payroll, revenues, expenditures and inventory were routine. Late in the year, a revised budget control system was adopted which

gave department heads more authority over expenditures appropriated in the master budget while at the same time tightening controls on unbudgeted expenditures.

In November, 1965, it was decided to consolidate the payroll function with personnel records on a tape system. Until the Board's IBM 360/30 is delivered, the payroll will be prepared at the IBM Data Centre.

In December, 1965, the Financial Accountant began programming the assessment procedures and a complete payroll and personnel records data retrieval package in addition to his normal responsibilities.

Production Accounting Division

Responsibilities and Functions

The Production Accounting Division is responsible for the receipt and processing of oil and gas production and disposition reports, and the preparation of detailed and summary information for use by the Board, industry and other agencies. In December, 1964, its responsibilities were increased by the addition of the Assessment Section which was formerly a part of Financial Accounting.

The major functions of the division are

(1) to collect from industry the well production data and well and plant disposition required under The Oil and Gas Conservation Act;

(2) to ensure that the reporting forms in use provide for the collection of required information and are revised to meet changing needs; and to co-operate

with other provincial and federal agencies in the use of comparable forms, and in the avoidance of duplicate collection of original data where possible;

(3) to examine the reports received to ensure that regulatory requirements are met by the operators and, with the assistance of data processing equipment, to prepare detailed and summary records;

(4) to check the reported oil, gas and water production against assigned allowables, and notify operators of the over or under status for each of their wells;

(5) to maintain records of Production Spacing Units, Blocks, Projects and Single Wells in connection with the new proration plan, showing minimum allowances and assigned acreages; and to make such records available to the Economic Studies Department for the preparation of the monthly proration order;

(6) to ensure that the monthly and annual statistical reports, and well production and pool production publications are kept up-to-date and processed on schedule; and

(7) to prepare the assessment roll, to issue assessment notices, process appeals, issue tax notices, and assist in the collection of the tax levy.

Organization and Staff

The Production Accountant and Assessor is the head of the

division and is responsible to the Chief Accountant. At mid-year, the Assistant Production Accountant was temporarily transferred to the task force of the Data Processing Department. For the period of transfer his work is being done by the Publications Supervisor and the Production Accountant. These duties include general supervision of the Production Records, Allowables, and Publications and Statistics Sections. The Assistant Assessor supervises the work of the Assessment Section. The staff complement at December 31, 1965 was as follows:

Production Accountant and Assessor, M. R. Blackadar	1
Assistant Production Accountant	1
Assistant Assessor	1
Clerks	17
Stenographer	1
Machine Operator	1
Total	22

Activities During the Year

Some 100,000 reports covering the production and disposition of oil, gas and water were processed during the year. In addition to the processing of incoming reports, the Publications Section contributed substantially to most of the information and statistical reports published by the Board.

New policies which have occupied the attention of this division during the year, and for which the development of new procedures was necessary, include the new proration plan and the revised well rate limitation concept, both of which became effec-

tive in May, 1965. A change in section 55 of the Drilling and Production Regulations in respect to the date that new oil and gas wells come on production made necessary closer surveillance of the date of receipt and the content of incoming reports filed for new wells.

During the year responsibility for the Well Information Service was transferred to the Production Accounting Division. Some improvements in the card format, in the information provided, and in the instructions included with the service were instituted in 1965 as a result of inter-departmental meetings.

I OFFICE SERVICES DEPARTMENT

Responsibilities and Functions

The Department is responsible for purchasing, printing and mailing, control of well records and central filing, building requirements and services, and switchboard and reception duties.

The major functions are as follows:

(1) to attend to space, service and insurance requirements of all Board buildings;

(2) to maintain a purchasing and stock control program;

(3) to observe and control motor vehicle operating costs;

(4) to print or arrange for commercial printing of letters, orders, forms, reports, publications, maps, amendments to Acts, regulations and the Index to Board Orders; to maintain address plates for subscription lists, mail lists, and for various record-opening forms for new wells;

(5) to attend to all mailing functions and manage all files other than departmental files; to serve public requests for information from filed documents;

(6) to provide hearing reporter and library services; and

(7) to maintain drilling records for all wells drilled.

Organization and Staff

The Department is headed by the Office Services Supervisor who reports to the Board. There are three sections in the department, namely Purchasing, Reproduction and Records, and each is headed by a supervisor. The staff complement at December 31, 1965 was as follows:

Office Services Supervisor, J. G. Anderson	1
Section Supervisors	3
Clerks	17
Machine Operators	6
Receptionists, Switchboard Operator, Typists and Stenographer	7
Total	34

Activities During the Year

The general level of activity in all sections remained constant during the year and no new policies were initiated. In preparation for the new filing and data processing system, some staff training was carried out. Approximately 840 orders were issued, 170,000 items of outgoing mail were handled, and some 1,700 purchase orders were issued.

J PERSONNEL DEPARTMENT

Responsibilities and Functions

The Personnel Department has the responsibility of assisting in the acquisition and maintenance of a competent staff for the Board, and ensuring that the Board's policies relating to personnel are carried out.

The principal functions are

(1) to recruit new staff in co-operation with other departments;

(2) to administer programs of employee evaluation, staff education and employee benefits;

(3) to administer the Board's salary policy and make annual surveys of salary rates; and

(4) with the assistance of the other departments, to prepare the annual salary budget for the next year, record variances during the year and control expenditures on overtime work.

Organization and Staff

The department is headed by the Personnel Officer, R. C. J. Webber, who reports to the Board. He is assisted by a Clerk and a Typist.

Activities During the Year

The department carried out a major survey of salary ranges paid by industry and by the Provincial and Federal Governments. The results of the survey assisted the Board in its annual review of staff salaries. Also, an extensive survey of employee benefits was made by the department.

Several personnel administration procedures were revised during the year. The first series of lectures in a proposed supervisory development program was arranged. The department co-ordinated the development of detailed job descriptions for all supervisory staff. A beginning was made on the conversion of Personnel Records to a magnetic tape data system in conjunction with the payroll conversion.

VI EXPENDITURE AND REVENUE

The Board's fiscal year end is March 31 but, since all other sections of this report relate to the calendar year, the Board has decided to ignore the three month difference and treat expected expenditures and revenues relating to the fiscal year April 1, 1965 to March 31, 1966 as applying to the 1965 calendar year. Financial data for previous fiscal years are applied to the calendar year in a similar manner.

Table 1 provides a summary and comparison of expenditures and revenue for the years 1961 to 1965 inclusive. The Board's net expenditure represents the sum of salary, other general operating and capital expenditures less collections from the sale of publications and information. The cost of capital acquisitions is charged in full against revenues in the year of purchase. Revenue of the Board is received through the levy of a tax upon the assessed value of all oil and gas properties liable to assessment and by a grant from the Provincial Government.

During the last five years, the Board's net expenditure has increased at an average annual rate of 4.1 per cent. Net expenditure during 1965 was $1,844,000, an increase of $94,000, or 5.4 per cent, over the previous year. Salary expenditures increased by $89,000 or 6.2 per cent to $1,535,000, while other general operating expenses decreased by $14,000 or 2.9 per cent to $467,000. Capital expenditure increased by $1,000 to $46,000 and collections decreased by $18,000 or 8.1 per cent to $204,000.

The 6.2 per cent increase in salary costs during 1965 was

above the five-year average of 4.1 per cent. This increase was due to a fairly significant general increase in rates of pay for the Board's staff and to a temporary staff increase in the Data Processing Department to implement the IBM System/360.

Table 2 gives a comparison of Board expenditures in terms of wells capable of production, industry production revenue and equivalent barrels of production*. Industry production revenue represents the total sales value of crude oil, natural gas and products at the well or plant. In 1965 the value of crude oil sales represented 67 per cent of the total production revenue as compared to 70 per cent in 1964.

The cost of operating the Board in terms of a capable well decreased from $123 in 1961 to $114 in 1965. A review of these costs over a longer period indicates that Board expenditure per capable well increased steadily until 1957 when it reached $136 and has been declining since that date. Board expenditures per equivalent barrel of production revenue decreased from 0.82 cents to 0.67 cents over the period 1961 to 1965. Efficient utilization of personnel and existing electronic data processing equipment, both permitting a reduction in the rate of staff increase, were largely responsible for the reduction in unit costs.

For 1965, as in previous years, the Provincial Government will provide the funds necessary to meet approximately 47 per cent of the Board's net expenditure. This amounts to some $869,000

$$*\text{Equivalent Barrels} = \frac{\text{total industry production revenue}}{\text{weighted average price per barrel of oil}}$$

and represents a direct grant from the Provincial Government of $738,000 to meet 40 per cent of the net expenditure and an additional $131,000 being the Government's share of the Board's tax levy. The remainder of the tax levy charged to all other owners of oil and gas properties assessed amounted to $975,000 in 1965, an increase of $77,000 over the previous year.

The assessed value of oil and gas properties subject to assessment in 1965 was $1,502,000,000 resulting in a mill rate of 0.75 mills to raise the portion of Board revenue met by taxation.

Table 1

Oil and Gas Conservation Board
Comparative Statement of Expenditure and Revenue
For the Five Years 1961-1965
(000's Dollars)

	1961	1962	1963	1964	1965
Expenditure					
Salaries	$1,305	$1,388	$1,415	$1,446	$1,535
General Operating					
Building rent, utilities	98	142	178	181	182
Printing, office supplies	75	78	88	87	81
Travelling, automobile	67	67	58	62	63
Machine rental and repairs	51	45	58	58	59
Telephone	20	21	20	19	20
Lab. and Field supplies	12	13	12	19	19
Miscellaneous	41	41	35	55	43
Total	364	407	449	481	467
Capital	53	57	47	45	46
Total	$1,722	$1,852	$1,911	$1,972	$2,048
Collections	151	174	192	222	204
Net Expenditure	$1,571	$1,678	$1,719	$1,750	$1,844
Revenue					
Industry Share of Tax*	$ 841	$ 905	$ 916	$ 898	$ 975
Provincial Government Share of tax*	102	102	115	124	131
Appropriation	628	671	688	728	738
Total Revenue	$1,571	$1,678	$1,719	$1,750	$1,844
Percentage of Increase in Net Expenditure over Previous Year	4.0	6.8	2.4	1.8	5.4

*Actual tax levy adjusted for surplus

Table 2

Oil and Gas Conservation Board
Comparison of Board Net Expenditure
Per Capable Well and Industry Production Revenue

	Total Capable Wells	Staff Complement at December 31	Industry Production Revenue (000)	*Annual Production Equivalent Barrels (000)	No. of Capable Wells Per Staff Member	Board Net Expenditure Per Capable Well (Dollars)	Board Net Expenditure Per Equivalent Barrel (Cents)
1961	12,752	241	$452,400	191,695	52	123	.82
1962	13,366	253	544,700	215,296	53	125	.78
1963	14,287	247	600,500	238,282	58	120	.72
1964	15,295	246	652,368	254,825	62	115	.68
1965	16,225	259	701,267	273,932	63	114	.67

$$*\text{Equivalent Barrels} = \frac{\text{Total industry production revenue}}{\text{Weighted average price per barrel of oil}}$$

VII PUBLICATIONS AND ADDRESSES

The Board makes available to industry and the general public a wide variety of publications and maps. The policy adopted in 1963 with regard to the pricing of these services was continued and is based on the principle that those costs associated with each publication which are over and above normal operating costs must be met by revenue generated from its sale.

The following new publications and maps were issued in 1965:

Publications

Theory and Practice of the Testing of Gas Wells (OGCB 65-10)

This manual, first issued in 1964 (OGCB 64-2) was revised and re-issued in 1965 to incorporate suggestions of industry and of the Board's staff.

Ultimate Reserve Factors for Oil Pools

Prior to the new proration plan, equivalent data was published under the title, "Well and Pool MPR Factors."

Appendix to PSU, Block or Project Approval Summary

Each issue contains a copy of the appendix issued to each operator of a production spacing unit, block or project.

New Maps

Structure Contours on Base of Fish Scale

A new map was prepared to show structure contours on the Base of the Fish Scale horizon over the entire Province. The scale of the map is one inch = 16 miles and the contour interval is 100 feet. It is based on a photographic reduction of the larger scaled area contour maps but does not, due to its small scale, depict wells or well values.

In addition to the above, the Board continued to issue the following regular publications during the year.

Statistical Publications

Weekly Drilling Report - Alberta Oil and Gas Industry

Monthly Statistics - Alberta Oil and Gas Industry
(Annual Statistics - December issue)

Cumulative Annual Statistics

Well Production Information Service (issued quarterly)

Pool Production Record

Technical Publications

Pressure-Depth and Temperature-Depth Relationships - Alberta Crude Oil Pools

Subsurface Pressure Data (issued quarterly)

Fluid Analyses - Alberta Oil and Gas Industry (issued quarterly)

Cumulative Index to the Schedules of Wells Drilled for Oil and Gas, December 31, 1964

Schedule of Wells Drilled for Oil and Gas in 1964

Reservoir Performance Charts

Oil Pools to December 31, 1964

Oil Pools to June 30, 1965

Gas Pools to December 31, 1964

Gas Pools to June 30, 1965

Gas Plant Performance Charts

Units and Conservation Schemes of the Province of Alberta - December 31, 1964

Reserves of Gas, Natural Gas Liquids, Crude Oil and Sulphur of the Province of Alberta, December 31, 1964

Oil and Gas Units

PVT Analyses and Special Core Information

Miscellaneous Publications

Index of Board Orders (issued monthly)

Miscellaneous Publications (Cont'd)

Production Accounting Handbook (amended when necessary)

Daily Licence Applications

Report of the Operations of the Oil and Gas Conservation Board, 1964

The following special reports resulted from major public hearings:

OGCB 65-3	Report and Decision on Review of Plan for Maximum Oil Production Rate Limitation in Alberta - March, 1965
OGCB 65-11	Report on Applications for Permits Authorizing the Removal of Propane from the Province of Canadian Hydrocarbons Limited and The British American Oil Company Limited under The Gas Resources Preservation Act, 1956.

The following addresses and technical papers were presented by members of the Board and its staff in 1965:

Speaker	Title of Address
G. W. Govier	"Athabasca Oil Sands" AIME Annual Meeting, Chicago, February 15, 1965
G. W. Govier	"Engineering, Economics and Conservation" The Chemical Institute of Canada Student Night, Edmonton, April 7, 1965
G. W. Govier	"Research and Petroleum Recovery" 16th Annual Technical Meeting, Petroleum and Natural Gas Division, Canadian Institute of Mining and Metallurgy, Calgary, May 6, 1965
G. W. Govier	"Alberta's New Proration Plan" 12th Annual Western Canada Conference on Financial Management and Petroleum Accounting, Banff, May 21, 1965
Vernon Millard	"Reconciling Public and Private Interests in the Oil Industry" Banff Student-Business Seminar, April 30, 1965

Speaker	Title of Address
M. O. Fuglem	"Oil and Gas Reserves of the Cypress Hills Area" A.S.P.G. 15th Annual Field Conference, 1965
K. W. Fuller	"Gas, Oil and Water Accounting" Petroleum Industry Training Service, Measurement Technology Course, March 24, 1965
K. W. Fuller	"Implementation of Alberta's New Proration Plan" Canadian Association of Production Accounting, April, 1965
L. E. Hicklin	"Gas Measurement" PITS Measurement Technology School, Calgary, March, 1965
L. E. Hicklin	"Gas Measurement" U. of A. Extension Course for Production Accountants, Calgary, November, 1965
P. D. Larbalestier	"Board's Regulations and Inspections as They Pertain to Workmen's Safety" Workmen's Compensation Board Inspectors, Edmonton, July, 1965
J. R. Pow	"Determination of the Volume of Oil and Gas Reservoirs, With Special Reference to Contouring" Mining and Geological Society, P. S. Warren Geological Society and geological faculty at the University of Alberta, January 27, 1965 and to the Dawson Club and geological faculty at the University of British Columbia, February 25, 1965
J. R. Pow	"A Geological Description and Reserve Estimate of the Oil Sands of Northern Alberta" Dawson Club and geological faculty at the University of British Columbia, February 25, 1965.
E. Stoian	"Computing and Data Processing" Kiwanis Career Lectures, Queen Elizabeth, William Aberhart, Crescent Heights and Henry Wise Wood High Schools, Calgary, February 24, April 6, April 29 and May 5, 1965

Speaker	Title of Address
E. Stoian	"Fundamentals and Applications of the Monte Carlo Method" Annual Technical Meeting, the Petroleum Society of C.I.M., Calgary, May, 1965
N. A. Strom	"Proration Plan" Alberta Society of Petroleum Geologists, Calgary, January 21, 1965
	and to the
	Canadian Association of Petroleum Production Accountants, Calgary, February 23, 1965
N. A. Strom	"Regulation of Oil and Gas Production" Department of Extension Course (U.A.C.) on Gas and Oil Production, Calgary, April, 1965 and December, 1965
G. A. Warne	"Data Evaluation for Reservoir Calculations" Petroleum Industry Training Service Course on Fundamental Petroleum Reservoir Technology, Calgary, October, 1965 and Edmonton, December, 1965
H. J. Webber	"Development of Athabasca Oil Sands" Chemical Engineers Club of U. of A., Edmonton, March 4, 1965

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Author	Title of Technical Paper
G. W. Govier	"Developments in the Understanding of the Vertical Flow of Two Fluid Phases" Canadian Journal of Chemical Engineering, Vol. 43, No. 1, February 1965
G. W. Govier	"Enhanced Recovery of Petroleum" Journal of Canadian Petroleum Technology, Vol. 4, No. 3, July-September, 1965 (editorial)
G. W. Govier and R. A. S. Brown	"The Prediction of Voidage in Vertical Gas-Liquid Flow" Canadian Journal of Chemical Engineering, October, 1965

Author	Title of Technical Paper
H. N. Collins, G. R. Scott and D. L. Flock	"Improving Waterflood Recovery of Viscous Crude Oils by Chemical Control" Journal of Canadian Petroleum Technology, Vol. 4, No. 4, October-December, 1965
M. O. Fuglem	"Oil and Gas Reserves of the Cypress Hills Area" A.S.P.G. 15th Annual Field Conference Guide Book, September, 1965
N. J. Lashuk (in collaboration with the editor)	"Canada's Gas Plant Capacity Keeps Rising" Canadian Petro Engineering, July, 1965
E. Stoian	"Calculation and Evaluation of Gas S.G." Canadian Petro Engineering, January, 1965
E. Stoian	"Fundamentals and Applications of the Monte Carlo Method" Journal of Canadian Petroleum Technology, Vol. 4, No. 3, July-September, 1965

MAP OF

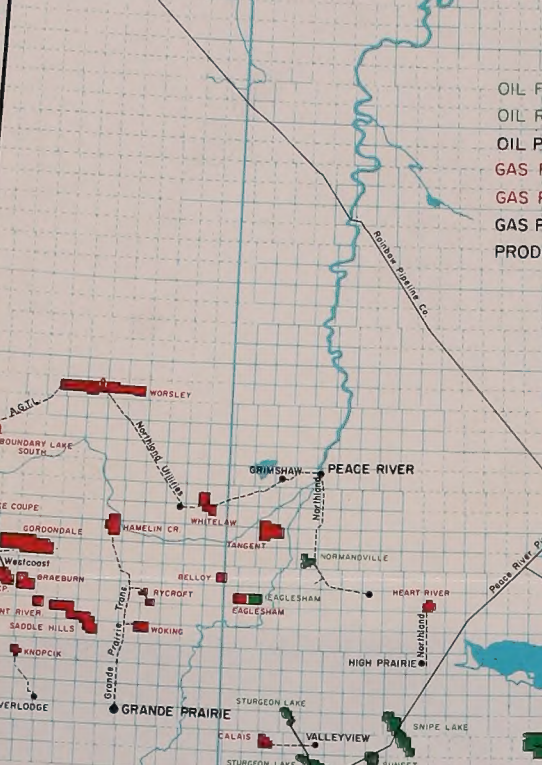
ALBERTA

SHOWING

DESIGNATED OIL AND GAS FIELDS, OIL AND GAS PIPELINES, REFINERIES, GAS PLANTS, PRINCIPAL TOWNS AND CITIES

LEGEND

- OIL FIELDS
- OIL REFINERIES
- OIL PIPELINES
- GAS FIELDS
- GAS PLANTS
- GAS PIPELINES
- PRODUCTS LINES



OIL AND GAS CONSERVATION BOARD
CALGARY, ALBERTA MARCH, 1966

JAN 4 1974